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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,293	11/06/2001	Yuji Fujimori, Suwa-Shi	110443	4030

7590 07/05/2002  
Oliff & Berridge  
PO Box 19928  
Alexandria, VA 22320

EXAMINER

TRAN, TAN N

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 07/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/914,293

Applicant(s)

FUJIMORI ET AL.

Examiner

TAN N TRAN

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11/06013.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 25-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 14-22 is/are rejected.
- 7) ☒ Claim(s) 11-13, 23 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### **Election/Restriction**

1. Applicant's election with traverse of Group I, claims 1-24 in Paper No. 10 is acknowledge. The traversal is on the ground(s) that "the search and examination of the entire application could be made without serious burden" and "if the search and examination of the entire application can be made without serious burden, the Examiner must examine it on the merits even though it includes claims to distinct or independent inventions", and "this policy should apply in the present application in order to avoid unnecessary delay and expense to Applicants and duplicative examination by the Patent Office". These are not found persuasive because referring to the restriction requirement set forth in the Office Action paper no.9, it clearly shows that the alternative method proposed by the examiner would be distinct from the process claimed. Applicant did not show the alternate method was incorrect. Additionally, the search is not coextensive as evidenced by the different fields of search for the process and product as cited in the previous restriction requirement. Furthermore, Applicant has not provided a convincing argument that the materially different processes would not be suitable in producing the claimed device. Therefore, the election requirement is made final.

### **Oath/Declaration**

2. The oath/declaration filed on 11/06/01 is acceptable.

### **Claim Objections**

3. Claims 3, and 4 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim, in claim 1. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

### **Claim Rejections - 35 USC § 102**

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 5, 9, 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Saurer et al. (5,482,570).

With regard to claim 1, Saurer et al. discloses a pair of electrodes (6,10); and a titanium dioxide semiconductor 14 which is disposed between the electrodes (6,10), the titanium dioxide semiconductor being formed with pores 22, and the titanium dioxide semiconductor 14 being arranged so as to form a junction J with respect to at least one of the pair of electrodes (6,10). It

is inherent that the titanium dioxide semiconductor 14 being arranged so as to form a rectification barrier with respect to at least one of the pair of electrodes (6,10) because rectification barrier is an metal semiconductor junction having the schottky type. (Note lines 54-61, column 2, figs. 3, 5, 8 of Saurer et al.).

With regard to claim 3, Saurer et al. discloses the rectification barrier is the shottky barrier being formed by contacting the titanium dioxide semiconductor 14 with at least one of the pair of electrodes (6,10). (Note lines 54-61, column 2, figs. 3, 5, 8 of Saurer et al.).

With regard to claim 5, Saurer et al. discloses the electrode 6, with which the titanium dioxide semiconductor 14 forms the rectification barrier, is formed in such a way as to penetrate into the surface of the titanium dioxide semiconductor 14 and the interior thereof. (Note figs. 3, 8 of Saurer et al.).

With regard to claim 9, Saurer et al. discloses the titanium dioxide semiconductor is porous and has the fractal structure. (Note figs. 3, 8 of Saurer et al.).

With regard to claim 10, Saurer et al. discloses the at least one of the pair of electrodes (6, 10), with which the titanium dioxide semiconductor 14 form the rectification barrier, is formed from a transparent electrode 6 made of ITO. (Note lines 29-35, column 3, figs. 3, 5, 8 of Saurer et al.).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter

as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2,4, 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saurer et al (5,482,570).

With regard to claim 2, Saurer et al. discloses the rectification barrier is formed by contacting the titanium dioxide semiconductor 14 with at least one of the pair of electrodes (6,10). It would have been obvious to one of ordinary skill in the art to recognize that the rectification barrier has a diode characteristic because such element is conventional in the art that the rectification barrier is the shottky type being formed by contacting the titanium dioxide semiconductor, increases the efficiency of collection of incident photons in relation to the cells.

With regard to claim 4, Saurer et al. discloses all claimed invention as in claim 1, except the rectifier barrier is the PN junction being formed by contacting the titanium dioxide semiconductor 14 with at least one of the pair of electrodes (6,10). However, although Saurer et al. do not teach exact the type of the rectifier barrier as that claimed by Applicant, the type differences are considered obvious design choices and are not patentable unless unobvious or expected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note in re Leshin, 125 USPQ 416.

With regard to claim 6, Saurer et al. discloses all the claimed subject matter except for the titanium dioxide semiconductor has a porosity of 5 to 90 percent. However, it would have been obvious to one of ordinary skill in the art to form the titanium dioxide semiconductor has a porosity of 5 to 90 percent in order to create electricity and electron-hole pairs in the particles from absorbed light, because such structure is conventional in the art for forming the titanium

dioxide semiconductor on the first electron. Note figs. 24, 39A, 39B and lines 21-26 in column 55 of Wakayama et al. (6,194,650) are cited to support for the well know position.

With regard to claims 7 and 8, Saurer et al. discloses all claimed invention as in claim 1, except for the titanium dioxide semiconductor has a porosity of 15 to 50 and 20 to 40 percent. However, although Saurer et al. do not teach exact the porosity of the titanium dioxide semiconductor as that claimed by Applicant, the type differences are considered obvious design choices and are not patentable unless unobvious or expected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note in re Leshin, 125 USPQ 416.

Claims 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saurer et al. (5,482,570).in view of Shiratsuchi et al. (6,084,176).

With regard to claim 14, Saurer et al. does not disclose the pairs of electrodes are formed by vacuum evaporation.

However, Shiratsuchi et al. disclose the pairs of electrodes are formed by vacuum evaporation. (Note lines 44-51, column 29, fig. 1 of Shiratsuchi et al.).

Therefore, it would have been obvious to one of ordinary skill in the art to form the Saurer et al.'s ~~the~~ pairs of electrodes ~~are formed~~ by vacuum evaporation such as taught by Shiratsuchi et al. in order to secure the dye-sensitized electrode having the hole transporting layer.

Applicant's claims 15-17 do not distinguish over Saurer et al. and Shiratsuchi et al. references regardless of the process used to form the electrodes and the titanium dioxide semiconductor such as sputtering, printing and subjected to visible rays absorbable processing to enable absorption of visible rays, because only the final product is relevant, not the process of making.

Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Fitzgerald, 205 USPQ 594, 596 (CCPA); In re Marosi et al., 218 USPQ 289 (CAFC); and most recently, In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that Applicant has burden of proof in such cases, as the above case law makes clear.

With regard to claim 18, Shiratsuchi et al. discloses organic dye 4 is adsorbed to the titanium dioxide semiconductor 3.

With regard to claims 19, 20, Saurer et al. and Shiratsuchi et al. disclose all the claimed subject matter except for inorganic dye, being adsorbed to the titanium dioxide semiconductor, includes inorganic carbon. However, it would have been obvious to one of ordinary skill in the art to form inorganic dye, being adsorbed to the titanium dioxide semiconductor, includes inorganic carbon, because such structure is conventional in the art for forming inorganic dye on



the titanium dioxide semiconductor. Note lines 44-51, column 29, fig. 1 of Shiratsuchi et al. are cited to support for the well know position.

With regard to claims 21, Saurer et al. and Shiratsuchi et al. disclose all claimed invention as in claim 1, except inorganic dye, being adsorbed to the titanium dioxide semiconductor, includes an inorganic matter obtained by dying carbon. However, although Saurer et al. do not teach exact the type of inorganic dye as that claimed by Applicant, the type differences are considered obvious design choices and are not patentable unless unobvious or expected results are obtained from these changes. It appears that these changes produce no functional differences and therefore would have been obvious. Note in re Leshin, 125 USPQ 416.

With regard to claim 22, Saurer et al. and Shiratsuchi et al. disclose all the claimed subject matter except for the titanium dioxide semiconductor has oxygen defects. However, it would have been obvious to one of ordinary skill in the art to form the titanium dioxide semiconductor has oxygen defects, because such structure is conventional in the art for forming inorganic dye on the titanium dioxide semiconductor in order to create electricity and electron-hole pairs in the particles from absorbed light.

#### *Allowable Subject Matter*

6. Claims 11-13, 23-24 are allowable over the prior art of record because none of these references disclose or can be combined to yield the claimed invention such as the pair of electrodes, with which said titanium dioxide semiconductor forms the rectification barrier, includes a solid iodide as recited in claim 11, the pair of electrodes, with which said titanium

Art Unit: 2826

dioxide semiconductor forms the rectification barrier, includes copper iodide as recited in claim 12, and the pair of electrodes, with which said titanium dioxide semiconductor forms the rectification barrier, includes silver iodide as recited in claim 13, and the titanium dioxide semiconductor includes impurity that include at least one of Cr and V as recited in claim 23.

### Conclusion

7. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tan Tran whose telephone number is (703) 305-3362. The examiner can normally be reached on M-F 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for after final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TT

June 2002

  
Minh Loan Tran  
Primary Examiner